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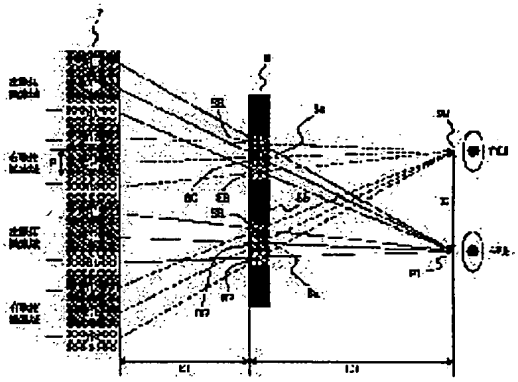
(54) STEREOSCOPIC VIDEO DISPLAY DEVICE

(57)Abstract:
PURPOSE: To obtain the stereoscopic video display device on which an observer can appreciate a stereoscopic image excellently nearby the display screen.
CONSTITUTION: On the display panel 7, pixel areas for the left eye where red pixels R1, green pixels G1, and blue pixels B1 for the left eye are arrayed in the right-left direction and pixel areas for the right eye where red pixels R2, green pixels G2, and blue pixels B23 for the right eye are arrayed in the right-left direction are formed alternately and on a barrier substrate 8, light transmission parts 8a which transmit light of an image from the display panel 7 and light shield parts 8b which cut off the light of the image from the display panel 7 are formed alternately. Then the light transmission part 8a is provided with red color filters 8R, green color filters 8G, and blue color filters 8B in the same order with the colors of the pixels.



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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] In the solid graphic display device which consists of a display panel which has a picture element for left eyes, and a picture element for right eyes, and a barrier substrate divided into the light from the picture element for left eyes, and light from the picture element for right eyes by shading the light of the image from this display panel partially The picture element region for left eyes which the picture element of the color from which it differs for left eyes has arranged along with a longitudinal direction to said display panel, The translucent part to which the picture element of the color from which it differs for right eyes forms by turns the picture element region for right eyes arranged along with a longitudinal direction in a longitudinal direction, and penetrates the light of the image from said display panel to said barrier substrate, The protection-from-light section which shades the light of the image from said display panel is formed in a longitudinal direction by turns. It prepares so that the color filter of the same color may be arranged like the color of said picture element. said translucent part — the color of the picture element of said display panel, and abbreviation — With the color filter of a different color from said picture element among the color filters which prepared the light from each picture element of said display panel in said protection-from-light section and said translucent part of said barrier substrate The solid graphic display device characterized by separating into the light from the picture element region for said left eyes, and light from the picture element region for said right eyes by shading.
[Claim 2] The barrier substrate divided into the light for left eyes, and the light for right eyes by shading a part of light from the light source, In the solid graphic display device which consists of a display panel which makes light for left eyes separated by this barrier substrate the light of the picture element for left eyes, and makes light for right eyes the light of the picture element for right eyes The picture element region for left eyes which the picture element of the color from which it differs for left eyes has arranged along with a longitudinal direction to said display panel, The translucent part to which the picture element of the color from which it differs for right eyes forms in a longitudinal direction by turns the picture element region for right eyes arranged along with a longitudinal direction, and penetrates the light from the light source to said barrier substrate, The protection-from-light section which shades the light of the image from said display panel is formed in a longitudinal direction by turns. The color filter of the same color is prepared so that it may become the same array as the color of said picture element. said translucent part — the color of the picture element of said display panel, and abbreviation — the inside of the color filter which prepared the light of each picture element of said display panel in said translucent part of said barrier substrate — abbreviation — only by the light which passed the color filter of the same color The solid graphic display device characterized by separating into the light from the picture element region for said left eyes, and light from the picture element region for said right eyes by forming.
[Claim 3] The solid graphic display device according to claim 1 or 2 characterized by for the picture element of the color from which it differs the object for the left eyes of said display panel and for right eyes consisting of a red picture element, a green picture element, and a blue picture element, and the color filter prepared in the translucent part of said barrier substrate consisting of a red filter, a green filter, and a blue filter.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the solid graphic display device which can observe the 3-dimensional scenography of a color, without using special glasses.
[0002]
[Description of the Prior Art] The parallax barrier system as shown in drawing 6 is proposed as an approach of displaying 3-dimensional scenography without using glasses conventionally.
[0003] In drawing 6 , display panels, such as a liquid crystal panel with which 1 displays a color image, and 2 are barrier substrates which pass a part of light from each picture element of said display panel 1. The arrangement pattern of the picture element of said display panel 1 is repeatedly arranged in order in order of the red picture element R1 for left eyes, the green picture element G2 for right eyes, the blue picture element B1 for left eyes, the red picture element R2 for right eyes, the green picture element G1 for left eyes, and blue picture element B-2 for right eyes along with the longitudinal direction.
[0004] Said barrier substrate 2 is a slit-like substrate with which a large number formation of the longwise opening 2a which penetrates the light from each picture element of said display panel 1 is carried out through barrier section 2b which shades light.
[0005] In such a solid graphic display device of a configuration, ahead of the screen The field 31 which only the light by which outgoing radiation was carried out carries out ON light through opening 2a of said barrier substrate 2 from the picture elements R1, G1, and B1 for left eyes, and the light by which outgoing radiation was carried out from the picture elements R2 and G2 for right eyes and B-2 is shaded by barrier section 2b, and does not carry out ON light, The field 32 which the light by which only the light by which outgoing radiation was carried out carried out ON light through opening 2a of said barrier substrate 2 from the picture elements R2 and G2 being reverse and for right eyes and B-2, and outgoing radiation was carried out from the picture elements R1, G1, and B1 for left eyes is shaded by barrier section 2b, and does not carry out ON light is formed.
[0006] And by setting up the distance between said fields 31 and said fields 32 so that it may become human being's interocular distance (for example, 65mm), locating an observer's left eye in a field 31, and locating a right eye in a field 32 In a left eye, an observer recognizes only the picture elements R1, G1, and B1 for left eyes, by the right eye, can recognize only the picture elements R2 and G2 for right eyes, and B-2, and can admire 3-dimensional scenography.
[0007] In the above solid graphic display devices, when preferred viewing distance of until is set [the pitch of the picture element for the left eyes of a display panel, and the picture element for right eyes / the interocular distance of P (equal to the picture element pitch P), and human being] to L1 for the distance from the screen of E and a display panel 1 to the barrier substrate 2 from t1 and the barrier substrate 2 to said fields 31 and 32, it becomes P:t1=E:L1 and the several 1 following relation is realized.
[0008]
[Equation 1]

$$L1 = \frac{E \cdot t1}{P}$$

[0009] That is, the preferred viewing distance L1 from the barrier substrate 2 to fields 31 and 32 is in inverse proportion to the pitch P of the picture element for left eyes, and the picture element for right eyes. However, when the thickness of 0.0175mm and a glass substrate pastes up a barrier substrate on the glass substrate of this liquid crystal panel using a 0.85mm (this value is the air scaled distance in consideration of the refractive index of a glass substrate) liquid crystal panel and a picture element pitch, for example, constitutes the above solid graphic display devices, it is set to P= 0.0175mm t 1= 0.85mm, and preferred viewing distance L1 becomes large with 3m or more. For this reason, if an observer does not separate from the display screen in the distance, he cannot observe 3-dimensional scenography, but he has the problem that 3-dimensional scenography with presence cannot be admired.

[0010] Drawing 7 is the conventional solid graphic display device which has arranged the barrier substrate 4 to the incidence side of the light of a display panel 1. Said barrier substrate 4 is a slit-like substrate with which a large number formation of the longwise opening 4a which penetrates the light from the flat-surface light source 5 is carried out through barrier section 4b which shades light.

[0011] In such a solid graphic display device of a configuration, the light by which outgoing radiation was carried out turns into slit-like light which passes opening 4a of said barrier substrate 4 from the flat-surface light source 5. The field 61 which only the light which passes the picture elements R1, G1, and B1 for left eyes among the light of the shape of said slit ahead of a display panel 1 carries out ON light, and does not carry out ON light of the light which passed the picture elements R2 and G2 for right eyes, and B-2 by this, Only the light which passed the picture elements R2 and G2 being reverse and for right eyes and B-2 carries out ON light, and the field 62 which does not carry out ON light of the light which passed the picture elements R1, G1, and B1 for left eyes is formed.
[0012] And by setting up the distance between said fields 61 and said fields 62 so that it may become human being's interocular distance (for example, 65mm), locating an observer's left eye in a field 61, and locating a right eye in a field 62 In a left eye, an observer recognizes only the picture elements R1, G1, and B1 for left eyes, by the right eye, can recognize only the picture elements R2 and G2 for right eyes, and B-2, and can admire 3-dimensional scenography.
[0013] In the above solid graphic display devices, when preferred viewing distance of until is set [the pitch of the picture element for left eyes, and the picture element for right eyes / the interocular distance of P (equal to the picture element pitch P), and human being] to L2 for the distance from E and the barrier substrate 4 to a display panel 1 from a display panel 1 to t2 and said fields 61 and 62, it is set to P:t2=E:L2+t2 and the several 2 following relation is realized.
[0014]
[Equation 2]

$$L2 = \frac{(E - P) \cdot t2}{P}$$

[0015] That is, the preferred viewing distance L from a display panel 1 to fields 61 and 62 is in inverse proportion to the pitch P of the picture element for left eyes, and the picture element for right eyes. However, when the thickness of 0.0175mm and a glass substrate pastes up a barrier substrate on the glass substrate of this liquid crystal panel using a 0.85mm (air scaled distance as which this value considered the refractive index of a glass substrate) liquid crystal panel and a picture element pitch, for example, constitutes the solid graphic display device of above-mentioned drawing 5 like the solid graphic display device of above-mentioned drawing 6 , it is set to P= 0.0175mm t 1= 0.85mm, and preferred viewing distance L2 becomes large with 3m or more. For this reason, if an observer does not separate from the display screen in the distance, he cannot observe 3-dimensional scenography, but he has the problem that 3-dimensional scenography with presence cannot be admired.
[0016]
[Problem(s) to be Solved by the Invention] In view of the fault of the above-mentioned conventional example, it succeeds in this invention, the location which can observe 3-dimensional scenography good is brought close to the display screen, and it aims at an observer offering the solid graphic display device which can admire 3-dimensional scenography with presence.
[0017]
[Means for Solving the Problem] The display panel with which the 1st solid graphic display device of this invention has a picture element for left eyes, and a picture element for right eyes, In what consists of a barrier substrate divided into the light from the picture element for left eyes, and light from the picture element for right eyes by shading the light of the image from this display panel partially The picture element region for left eyes which the picture element of the color from which it differs for left eyes has arranged along with a longitudinal direction to said display panel, The translucent part to which the picture element of the color from which it differs for right eyes forms by turns the picture element region for right eyes arranged along with a longitudinal direction in a longitudinal direction, and penetrates the light of the image from said display panel to said barrier substrate, The protection-from-light section which shades the light of the image from said display panel is formed in a longitudinal direction by turns. It prepares so that the color filter of the same color may be arranged like the color of said picture element. said translucent part -- the color of the picture element of said display panel, and abbreviation -- With the color filter of a different color from said picture element among the color filters which prepared the light from each picture element of said display panel in said protection-from-light section and said translucent part of said barrier substrate It is characterized by separating into the light from the picture element region for said left eyes, and light from the picture element region for said right eyes by shading.
[0018] Moreover, the barrier substrate divided into the light for left eyes, and the light for right eyes when the 2nd solid graphic display device of this invention shades a part of light from the light source, In what consists of a display panel which makes light for left eyes separated by this barrier substrate the light of the picture element for left eyes, and makes light for right eyes the light of the picture element for right eyes The picture element region for left eyes which the picture element of the color from which it differs for left eyes has arranged along with a longitudinal direction to said display panel, The translucent part to which the picture element of the color from which it differs for right eyes forms horizontally by turns the picture element region for right eyes arranged along with a longitudinal direction, and penetrates the light from the light source to said barrier substrate, The protection-from-light section which shades the light of the image from said display panel is formed in a longitudinal direction by turns. The color filter of the same color is prepared so that it may become the same array as the color of said picture element. said translucent part -- the color of the picture element of said display panel, and abbreviation -- the inside of the color filter which prepared the light of each picture element of said display panel in said translucent part of said barrier substrate -- abbreviation -- it is characterized by separating into the light from the picture

element region for said left eyes, and light from the picture element region for said right eyes by forming only by the light which passed the color filter of the same color.
[0019] Furthermore, the 1st of this invention and the 2nd solid graphic display device are characterized by for the picture element of the color from which it differs the object for the left eyes of said display panel and for right eyes consisting of a red picture element, a green picture element, and a blue picture element, and the color filter prepared in the translucent part of said barrier substrate consisting of a red filter, a green filter, and a blue filter.
[0020]
[Function] According to the 1st above-mentioned solid graphic display device, the pitch of the picture element region for left eyes and the picture element region for right eyes becomes larger than the pitch of the picture element which constitutes a display panel. That is, the denominator in above-mentioned several 1 becomes large, and preferred viewing distance becomes small.
[0021] Moreover, according to the 2nd above-mentioned solid graphic display device, the pitch of the picture element region for left eyes and the picture element region for right eyes becomes larger than the pitch of the picture element which constitutes a display panel. That is, the denominator in above-mentioned several 2 becomes large, and preferred viewing distance becomes small.
[0022] Furthermore, the picture element of the color from which it differs the object for the left eyes of said display panel and for right eyes consists of a red picture element, a green picture element, and a blue picture element, and when the above-mentioned 1st and the 2nd solid graphic display device are constituted by preparing three color filters, a red color filter, a green color filter, and a blue color filter, in the translucent part of said barrier substrate, the good color 3-dimensional scenography which the three primary colors used can be displayed. And when it is the thing of the structure where the picture element of the color with the same picture element arrangement of said display panel is located in a line in the vertical direction, for example, the pitch of a picture element region on either side will be about 3 times the picture element pitch of a display panel, and about 1/of preferred viewing distances is set to 3.
[0023]
[Example] Hereafter, the example of this invention is explained to a detail, referring to a drawing. Drawing 1 is drawing showing the configuration of the solid graphic display device of the 1st example.
[0024] In drawing 1 , display panels, such as a liquid crystal panel with which 7 displays a color image, and 8 are barrier substrates which pass a part of light from each picture element of said display panel 7. As the arrangement pattern of the picture element of said display panel 7 is shown in drawing 2 , the picture element of the same color is located in a line in the vertical direction. In a longitudinal direction, it sees from an observer, and, in order, the pattern of the order of the red picture element R1 for left eyes, the green picture element G1 for left eyes, the blue picture element B1 for left eyes, the red picture element R2 for right eyes, the green picture element G2 for right eyes, and blue picture element B-2 for right eyes is repeatedly arranged toward left-hand side from right-hand side. That is, the picture element region for left eyes which consists of picture elements R1, G1, and B1 of each color for left eyes, the picture elements R2 and G2 of each color for right eyes, and the picture element region for right eyes which consists of B-2 are formed by turns.
[0025] Each picture elements R1, G1, B1, R2, and G2 of said display panel 7 and B-2 are equipped with the color filter of a color according to the color of each picture element, and serve as red and a green and blue picture element with this color filter. Drawing 3 is drawing showing the optical property of said color filter, and the permeability distribution by the wavelength of the light of the red color filter with which R was prepared in the red picture elements R1 and R2, the permeability distribution by the wavelength of the light of the green color filter with which G was prepared in the green picture elements G1 and G2, and B are permeability distribution by the wavelength of the light of the blue color filter prepared in the blue picture element B1 and B-2 among drawing.
[0026] Said barrier substrate 8 is a slit-like substrate with which a large number formation of the longwise translucent part 8a which penetrates the light from each picture element of said display panel 7 is carried out through barrier section 8b which shades light. It sees in said translucent part 8a from an observer, and red color filter 8R, green color filter 8G, and blue color filter 8B are formed in it in order toward left-hand side from right-hand side. In addition, the order of an array of the color filter of these three colors is the same as the order of an array of the picture element of three colors in said display panel 7.
[0027] Moreover, the optical property of said red, green, and the blue color filters 8R, 8G, and 8B is the same as the optical property of the color filter with which the picture elements R1, R2, G1, G2, and B1 of said display panel and B-2 are equipped, and it is as being shown in drawing 3 . That is, in drawing 3 , permeability distribution according [permeability distribution according / R / to the wavelength of the light of red color filter 8R and G] to the wavelength of the light of green color filter 8G and B are permeability distribution by the wavelength of the light of blue color filter 8B.
[0028] The dimension in each longitudinal direction of the color filters 8R, 8G, and 8B prepared in translucent part 8a of said barrier substrate 8 is equal respectively at A.E/(E+3P). Moreover, the dimension in the longitudinal direction of protection-from-light section 8b of said barrier substrate 8 is -(4 P-A) E/(E+3P). However, A is [interocular distance and P of the picture element opening dimension of a display panel (liquid crystal panel) 7 and E] the picture element pitches of a display panel (liquid crystal panel) 7. in addition, a dimension [in / in the dimension in each longitudinal direction of said color filters 8R, 8G, and 8B / the longitudinal direction of translucent part 2a of the thing of conventional drawing 6] and abbreviation -- it is the same.
[0029] The light by which outgoing radiation was carried out from the red picture elements R1 and R2 of said display

panel 7 passes only red color filter 8R prepared in translucent part 8a of said barrier substrate 8, and green color filter 8G and blue color filter 8B does not pass. That is, said green color filter 8G and blue color filter 8B functions from the red picture elements R1 and R2 as the protection-from-light section like barrier section 8b to the light by which outgoing radiation was carried out.

[0030] Moreover, the light by which outgoing radiation was carried out from the green picture elements G1 and G2 of said display panel 7 passes only green color filter 8G prepared in translucent part 8a of said barrier substrate 8, and red color filter 8R and blue color filter 8B do not pass. That is, said red color filter 8R and blue color filter 8B function from the green picture elements G1 and G2 as the protection-from-light section like barrier section 8b to the light by which outgoing radiation was carried out.

[0031] Moreover, the light by which outgoing radiation was carried out from the blue picture element B1 of said display panel 7 and B-2 passes only blue color filter 8B prepared in translucent part 8a of said barrier substrate 8, and red color filter 8R and green color filter 8G do not pass. Namely, to the light by which outgoing radiation was carried out, said red color filter 8R and green color filter 8G function as the protection-from-light section like barrier section 8b from the blue picture element B1 and B-2.

[0032] being such — the — one — an example — a stereo — a graphic display device — **** — the barrier — a substrate — eight — the front — **** — a left eye — ** — red — a picture element — R — one — from — outgoing radiation — carrying out — having had — light — said — red — a color filter — eight — R — a passage — a left eye — ** — green — a picture element — G — one — from — outgoing radiation — carrying out — having had — light — said — green — color filter 8G — a passage — the light for left eyes by which outgoing radiation be carried out from the blue picture element B1 — said blue color filter 8B — a passage — ON light — there is a field 91 to carry out. In this field 91, the light by which outgoing radiation was carried out from the red picture element R2 for right eyes Said green color filter 8G, It is shaded by blue color filter 8B and barrier section 8b, and ON light is not carried out. The light by which outgoing radiation was carried out from the green picture element G2 for right eyes Said red color filter 8R, It is shaded by said red color filter 8R, green color filter 8G, and barrier section 8b, and the light by which was shaded by blue color filter 8B and barrier section 8b, and did not carry out ON light, but outgoing radiation was carried out from blue picture element B-2 for right eyes does not carry out ON light.

[0033] moreover, the light by which outgoing radiation was carried out ahead [of the barrier substrate 8] from the picture element R2 of the red for right eyes — said red color filter 8R — a passage — the object for right eyes — the light by which outgoing radiation was carried out from the green picture element G2 — said — green — color filter 8G — a passage — the object for right eyes — the light by which outgoing radiation was carried out from blue picture element B-2 — said blue color filter 8B — a passage — ON light — there is a field 92 to carry out. In this field 92, the light by which outgoing radiation was carried out from the red picture element R1 for left eyes Said green color filter 8G, It is shaded by blue color filter 8B and barrier section 8b, and ON light is not carried out. The light by which outgoing radiation was carried out from the green picture element G1 for left eyes Said red color filter 8R, It is shaded by said red color filter 8R, green color filter 8G, and barrier section 8b, and the light by which was shaded by blue color filter 8B and barrier section 8b, and did not carry out ON light, but outgoing radiation was carried out from the blue picture element B1 for left eyes does not carry out ON light.

[0034] That is, by locating a left eye in a field 91 and locating a right eye in a field 92, only an observer's picture elements R1, G1, and B1 for left eyes can be seen, without the ability of the picture elements R2 and G2 for right eyes, and B-2 being seen, and only the picture elements R2 and G2 for right eyes and B-2 can be seen [an observer] by the left eye, with a right eye, without the ability of the picture elements R1, G1, and B1 for left eyes being seen. Thereby, in a left eye, an observer can recognize the image for left eyes and can observe 3-dimensional scenography by recognizing the image for right eyes by the right eye.

[0035] In the above solid graphic display devices of the 1st example, as for the array of the picture element in the horizontal direction of a display panel 7, the picture element region for right eyes where the picture element region for left eyes where 3 picture elements of the picture elements R1, G1, and B1 for left eyes come to continue, the picture elements R2 and G2 for right eyes, and 3 picture elements of B-2 come to continue is arranged by turns. That is, the picture element region for left eyes and the picture element region for right eyes are arranged by pitch 3P 3 times as much as the picture element pitch P.

[0036] Therefore, the preferred viewing distance L3 from the barrier substrate 8 to said fields 91 and 92 becomes like following several 3, and becomes abbreviation 1/3 compared with the conventional solid graphic display device shown in drawing 6 .

[0037]

[Equation 3]

$$L3 = \frac{E \cdot t3}{3P}$$

[0038] For example, a picture element pitch uses 0.0175mm and the liquid crystal panel whose thickness of a glass substrate is 0.85mm (this value is the air scaled distance in consideration of the refractive index of a glass substrate) as a display panel 7. Paste up said barrier substrate 8 on the glass substrate of said liquid crystal panel, and the solid graphic display device of the 1st example is constituted. When the distance between a field 91 and a field 92 is set up so that it may become 65mm of human being's interocular distance, it is set to P= 0.0175mm t 3= 0.85mm, preferred viewing distance L3 is set to about 1m from several three, and the display screen is approached

compared with the former. For this reason, an observer can observe 3-dimensional scenography near the display screen, and can admire 3-dimensional scenography with presence.

[0039] Drawing 4 is drawing showing the configuration of the solid graphic display device of the 2nd example. In drawing 4 , display panels, such as a liquid crystal panel with which 7 displays a color image, and 10 are barrier substrates which pass a part of light of the flat-surface light source 11.

[0040] The arrangement pattern of the picture element of said display panel 7 is the same as the arrangement pattern of the display panel 7 of the 1st above-mentioned example, and the explanation is omitted here. Said barrier substrate 10 is a slit-like substrate with which a large number formation of the longwise translucent part 10a which penetrates the light from said flat-surface light source 11 is carried out through barrier section 10b which shades light. It sees in said translucent part 10a from an observer, and red color filter 10R, green color filter 10G, and blue color filter 10B are formed in it in order toward left-hand side from right-hand side. In addition, the order of an array of the color filter of these three colors is the same as the order of an array of the picture element of three colors in said display panel 7.

[0041] The dimension in each longitudinal direction of the color filters 10R, 10G, and 10B prepared in translucent part 10a of said barrier substrate 10 is equal respectively at A.E/(E-3P). Moreover, the dimension in the longitudinal direction of protection-from-light section 10b of said barrier substrate 10 is -(4 P-A) E/(E-3P). However, A is [interocular distance and P of the picture element opening dimension of a display panel (liquid crystal panel) 7 and E] the picture element pitches of a display panel (liquid crystal panel) 7. in addition, a dimension [in / in the dimension in each longitudinal direction of said color filters 10R, 10G, and 10B / the longitudinal direction of translucent part 2a of the thing of conventional drawing 6] and abbreviation — it is the same.

[0042] What serves as light of the red picture elements R1 and R2 of a display panel 7 from said flat-surface light source 11 among the light by which outgoing radiation was carried out is only the stripe-like light which passed red color filter 10R prepared in translucent part 10a of said barrier substrate 10, and, in the stripe-like light which passed green color filter 10G or blue color filter 10B, the light of the red picture elements R1 and R2 does not become. That is, said green color filter 10G and blue color filter 10B functions as the protection-from-light section like barrier section 10b to the red picture elements R1 and R2.

[0043] Moreover, what serves as light of the green picture elements G1 and G2 of a display panel 7 from said flat-surface light source 11 among the light by which outgoing radiation was carried out is only the stripe-like light which passed green color filter 10G prepared in translucent part 10a of said barrier substrate 10, and, in the stripe-like light which passed red color filter 10R or blue color filter 10B, the light of the green picture elements G1 and G2 does not become. That is, said red color filter 10R and blue color filter 10B function as the protection-from-light section like barrier section 10b to the green picture elements G1 and G2.

[0044] Moreover, what serves as the blue picture element B1 of a display panel 7 and light of B-2 from said flat-surface light source 11 among the light by which outgoing radiation was carried out is only the stripe-like light which passed blue color filter 10B prepared in translucent part 10a of said barrier substrate 10, and, in the stripe-like light which passed red color filter 10R or green color filter 10G, the light of the blue picture element B1 and B-2 does not become. Namely, to the blue picture element B1 and B-2, said red color filter 10R and green color filter 10G function as the protection-from-light section like barrier section 10b.

[0045] In such a solid graphic display device of the 2nd example The stripe-like light which passed said red color filter 10R ahead of the display panel 7 turns into light of the red picture element R1 for the left eyes of a display panel 7, and carries out ON light. The stripe-like light which passed said green color filter 10G turns into light of the green picture element G1 for the left eyes of a display panel 7, and carries out ON light. The stripe-like light which passed said blue color filter 10B turns into light of the blue picture element B1 for the left eyes of a display panel 7, and the field 121 which carries out ON light is formed. In addition, in this field 121, ON light of the picture elements R2 and G2 for right eyes and the light from B-2 is not carried out.

[0046] Moreover, the stripe-like light which passed said red color filter 10R ahead of said display panel 7 turns into light of the red picture element R2 for the right eyes of a display panel 7, and carries out ON light. The stripe-like light which passed said green color filter 10G turns into light of the green picture element G2 for the right eyes of a display panel 7, and carries out ON light. The stripe-like light which passed said blue color filter 10B turns into light of blue picture element B-2 for the right eyes of a display panel 7, and the field 122 which carries out ON light is formed. In addition, in this field 122, ON light of the light from the picture elements R1, G1, and B1 for left eyes is not carried out.

[0047] That is, by locating a left eye in a field 121 and locating a right eye in a field 122, only an observer's picture elements R1, G1, and B1 for left eyes can be seen, without the ability of the picture elements R2 and G2 for right eyes, and B-2 being seen, and only the picture elements R2 and G2 for right eyes and B-2 can be seen [an observer] by the left eye, with a right eye, without the ability of the picture elements R1, G1, and B1 for left eyes being seen. Thereby, in a left eye, an observer can recognize the image for left eyes and can observe 3-dimensional scenography by recognizing the image for right eyes by the right eye.

[0048] In the above solid graphic display devices of the 2nd example, as for the array of the picture element in the horizontal direction of a display panel 7, the picture element region for right eyes where the picture element region for left eyes where 3 picture elements of the picture elements R1, G1, and B1 for left eyes come to continue, the picture elements R2 and G2 for right eyes, and 3 picture elements of B-2 come to continue is arranged by turns. That is, the picture element region for left eyes and the picture element region for right eyes are arranged by pitch 3P 3 times as much as the picture element pitch P.

[0049] Therefore, the preferred viewing distance L4 from the display panel 7 to said fields 121 and 122 becomes like following several 4, and becomes abbreviation 1/3 compared with the conventional solid graphic display device shown in drawing 7 .

[0050]

[Equation 4]

$$L4 = \frac{(E - P) \cdot t4}{3P}$$

[0051] For example, the thickness of 0.0175mm and a glass substrate uses [a picture element pitch] a 0.85mm (this value is the air scaled distance in consideration of the refractive index of a glass substrate) liquid crystal panel as a display panel 7. Paste up the barrier substrate 10 on the glass substrate of this aforementioned liquid crystal panel, and the solid graphic display device of the 2nd example is constituted. When the distance between a field 121 and a field 122 is set up so that it may become 65mm of human being's interocular distance, it is set to P= 0.0175mm t 4= 0.85mm, preferred viewing distance L4 is set to about 1m from several four, and the display screen is approached compared with the conventional example. For this reason, an observer can observe 3-dimensional scenography near the display screen, and can admire 3-dimensional scenography with presence.

[0052] In addition, although the thing of the structure where the picture element of the color same as a display panel 7 is located in a line in the vertical direction was used in the 1st and 2nd above-mentioned example, this invention is applicable also to the thing of the structure where arrangement of a picture element differs in the above-mentioned display panel 7.

[0053] For example, as shown in drawing 5 , this invention is applicable also to the display panel of the picture element structure of delta arrangement where the picture element of the oddth line and the picture element of the eventh line are formed in the longitudinal direction by shifting by the half-picture element. In this case, if the picture element, the picture element of odd lines and the picture element of even lines, of two lines is observed as 1 set, the picture element region which consists of a picture element region which consists of picture elements R1, G1, and B1 of each color for left eyes, and the picture elements R2 and G2 of each color for right eyes and B-2 is set horizontally, and is formed by turns. In addition, in drawing 5 , each picture element region is divided with the broken line.

[0054] Moreover, this invention may arrange a lens ahead of a display, and may apply it to the thing which makes an observer observe a virtual image.

[0055]

[Effect of the Invention] According to this invention, an observer can offer the solid graphic display device which can admire the 3-dimensional scenography which has presence near the display screen.

[0056] Furthermore, according to this invention, the solid graphic display device in which good color display is also possible can be offered.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing showing the basic configuration of the solid graphic display device of the 1st example of this invention.
[Drawing 2] It is drawing showing the arrangement pattern of the picture element of the display panel used for the 1st example of this invention.
[Drawing 3] It is drawing showing the permeability distribution by the wavelength of the light of the color filter used for the barrier substrate of the 1st example of this invention.
[Drawing 4] It is drawing showing the basic configuration of the solid graphic display device of the 2nd example of this invention.
[Drawing 5] It is drawing in which using for other examples of this invention and showing the arrangement pattern of the picture element of a ****** display panel.
[Drawing 6] It is drawing showing the basic configuration of the conventional solid graphic display device.
[Drawing 7] It is drawing showing the basic configuration of the conventional solid graphic display device.
[Explanation of agreement]
7 Display Panel
8 Barrier Substrate
8a Translucent part
8b Protection-from-light section
8R Red color filter
8G Green color filter
8B Blue color filter
10 Barrier Substrate
10a Translucent part
10b Protection-from-light section
10R Red color filter
10G Green color filter
10B Blue color filter
R1 Red picture element for left eyes
G1 Green picture element for left eyes
B1 Blue picture element for left eyes
R2 Red picture element for left eyes
G2 Green picture element for left eyes
B-2 Blue picture element for left eyes

[Translation done.]

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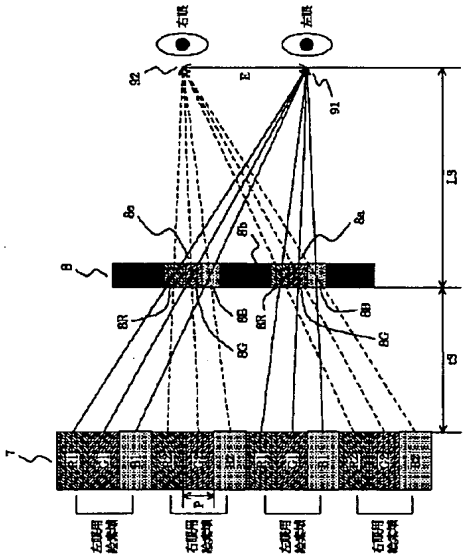
(54)【発明の名称】　立体映像表示装置

(57)【要約】

【目的】　観察者が立体映像を表示画面に近付くで良好に観賞することが出来る立体映像表示装置を提供する。

【構成】　表示パネル７に左眼用の赤色絵素Ｒ１、緑色絵素Ｇ１、青色絵素Ｂ１が左右方向に沿って配列している左眼用の絵素域と、右眼用の赤色絵素Ｒ２、緑色絵素Ｇ２、青色絵素Ｂ２が左右方向に沿って配列している右眼用の絵素域とを左右方向において交互に形成し、バリア基板８に前記表示パネル７からの映像の光を透過する透光部８ａと、前記表示パネル７からの映像の光を遮光する遮光部８ｂとを左右方向に交互に形成し、前記透光部８ａに赤色カラーフィルタ８Ｒ、緑色カラーフィルタ８Ｇ、青色カラーフィルタ８Ｂを前記絵素の色と同時順番で設ける。



【特許請求の範囲】

【請求項１】　左眼用の絵素と右眼用の絵素とを有する表示パネルと、該表示パネルからの映像の光を部分的に遮光することにより左眼用の絵素からの光と右眼用の絵素からの光とに分離するバリア基板とからなる立体映像表示装置において、前記表示パネルに左眼用の異なる色の絵素が左右方向に沿って配列している左眼用の絵素域と、右眼用の異なる色の絵素が左右方向に沿って配列している右眼用の絵素域とを左右方向において交互に形成し、前記バリア基板に前記表示パネルからの映像の光を透過する透光部と、前記表示パネルからの映像の光を遮光する遮光部とを左右方向に交互に形成し、前記透光部に前記表示パネルの絵素の色と略同じ色のカラーフィルタを前記絵素の色と同様に配列するように設け、前記表示パネルの各絵素からの光を前記バリア基板の前記遮光部及び前記透光部に設けたカラーフィルタのうち前記絵素とは異なる色のカラーフィルタにより遮光することにより前記左眼用の絵素域からの光と前記右眼用の絵素域からの光とに分離することを特徴とする立体映像表示装置。

【請求項２】　光源からの光の一部を遮光することにより左眼用の光と右眼用の光とに分離するバリア基板と、該バリア基板により分離された左眼用の光を左眼用の絵素の光とし、右眼用の光を右眼用の絵素の光とする表示パネルとからなる立体映像表示装置において、前記表示パネルに左眼用の異なる色の絵素が左右方向に沿って配列している左眼用の絵素域と、右眼用の異なる色の絵素が左右方向に沿って配列している右眼用の絵素域とを左右方向に交互に形成し、前記バリア基板に光源からの光を透過する透光部と、前記表示パネルからの映像の光を遮光する遮光部とを左右方向に交互に形成し、前記透光部に前記表示パネルの絵素の色と略同じ色のカラーフィルタを前記絵素の色と同様の配列になるように設け、前記表示パネルの各絵素の光を前記バリア基板の前記透光部に設けたカラーフィルタのうち略同じ色のカラーフィルタを通過した光だけにより形成することにより前記左眼用の絵素域からの光と前記右眼用の絵素域からの光とに分離することを特徴とする立体映像表示装置。

【請求項３】　前記表示パネルの左眼用及び右眼用の異なる色の絵素が赤色絵素、緑色絵素及び青色絵素よりなり、前記バリア基板の透光部に設けたカラーフィルタが赤色フィルタ、緑色フィルタ及び青色フィルタよりなることを特徴とする請求項１または２記載の立体映像表示装置。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は特殊な眼鏡を用いることなしにカラーの立体映像を観察することが出来る立体映像表示装置に関する。

【０００２】

【従来の技術】従来、眼鏡を使用しないで立体映像を表示する方法として、図６に示すようなパララックスバリア方式が提案されている。

【０００３】図６において、１はカラー映像を表示する液晶パネル等の表示パネル、２は前記表示パネル１の各絵素からの光の一部を通過させるバリア基板である。前記表示パネル１の絵素の配置パターンは、左右方向に沿って順に、左眼用の赤色絵素Ｒ１、右眼用の緑色絵素Ｇ２、左眼用の青色絵素Ｂ１、右眼用の赤色絵素Ｒ２、左眼用の緑色絵素Ｇ１、右眼用の青色絵素Ｂ２の順で繰り返し配列されている。

【０００４】前記バリア基板２は前記表示パネル１の各絵素からの光を透過する縦長の開口部２ａが光を遮光するバリア部２ｂを介して多数形成されているスリット状の基板である。

【０００５】このような構成の立体映像表示装置では、表示面の前方には、左眼用の絵素Ｒ１、Ｇ１、Ｂ１から出射された光だけが前記バリア基板２の開口部２ａを通って入光し、右眼用の絵素Ｒ２、Ｇ２、Ｂ２から出射された光はバリア部２ｂにより遮光されて入光しない領域３１と、その逆で右眼用の絵素Ｒ２、Ｇ２、Ｂ２から出射された光だけが前記バリア基板２の開口部２ａを通って入光し、左眼用の絵素Ｒ１、Ｇ１、Ｂ１から出射された光はバリア部２ｂにより遮光されて入光しない領域３２とが形成される。

【０００６】そして、前記領域３１と前記領域３２との間の距離を人間の眼間距離（例えば６５ｍｍ）になるように設定し、観察者の左眼を領域３１に位置させ、右眼を領域３２に位置させることにより、観察者は左眼では左眼用の絵素Ｒ１、Ｇ１、Ｂ１だけを認識し、右眼では右眼用の絵素Ｒ２、Ｇ２、Ｂ２だけを認識することが出来、立体映像を観賞することが出来る。

【０００７】上述のような立体映像表示装置では、表示パネルの左眼用の絵素と右眼用の絵素とのピッチをＰ（絵素ピッチＰに等しい）、人間の眼間距離をＥ、表示パネル１の表示面からバリア基板２までの距離をｔ１、バリア基板２から前記領域３１、３２にまでの適視距離をＬ１とした場合、Ｐ：ｔ１＝Ｅ：Ｌ１となり、下記の数１の関係が成り立つ。

【０００８】

【数１】

$$L1 = \frac{E \cdot t1}{P}$$

【０００９】即ち、バリア基板２から領域３１、３２までの適視距離Ｌ１は、左眼用の絵素と右眼用の絵素とのピッチＰに反比例する。しかしながら、例えば、絵素ピッチが０．０１７５ｍｍ、ガラス基板の厚みが０．８５ｍｍ（この値はガラス基板の屈折率を考慮した空気換算距離である）の液晶パネルを用い、該液晶パネルのガラス基板にバリア基板を接着して上述のような立体映像表

示装置を構成した場合、Ｐ＝０．０１７５ｍｍ、ｔ１＝０．８５ｍｍとなり、適視距離Ｌ１は３ｍ以上と大きくなる。このため、観察者は表示画面から遠くに離れなければ立体映像を観察することは出来ず、臨場感のある立体映像を観賞することが出来ないという問題がある。

【００１０】図７は表示パネル１の光の入射側にバリア基板４を配置した従来の立体映像表示装置である。前記バリア基板４は平面光源５からの光を透過する縦長の開口部４ａが光を遮光するバリア部４ｂを介して多数形成されているスリット状の基板である。

【００１１】このような構成の立体映像表示装置では、平面光源５から出射された光は前記バリア基板４の開口部４ａを通過するスリット状の光となる。これにより、表示パネル１の前方には、前記スリット状の光のうち左眼用の絵素Ｒ１、Ｇ１、Ｂ１を通過する光だけが入光し、右眼用の絵素Ｒ２、Ｇ２、Ｂ２を通過した光は入光しない領域６１と、その逆で右眼用の絵素Ｒ２、Ｇ２、Ｂ２を通過した光だけが入光し、左眼用の絵素Ｒ１、Ｇ１、Ｂ１を通過した光は入光しない領域６２とが形成される。

【００１２】そして、前記領域６１と前記領域６２との間の距離を人間の眼間距離（例えば６５ｍｍ）になるように設定し、観察者の左眼を領域６１に位置させ、右眼を領域６２に位置させることにより、観察者は左眼では左眼用の絵素Ｒ１、Ｇ１、Ｂ１だけを認識し、右眼では右眼用の絵素Ｒ２、Ｇ２、Ｂ２だけを認識することが出来、立体映像を観賞することが出来る。

【００１３】上述のような立体映像表示装置では、左眼用の絵素と右眼用の絵素とのピッチをＰ（絵素ピッチＰに等しい）、人間の眼間距離をＥ、バリア基板４から表示パネル１までの距離をｔ２、表示パネル１から前記領域６１、６２にまでの適視距離をＬ２とした場合、Ｐ：ｔ２＝Ｅ：Ｌ２＋ｔ２となり、下記の数２の関係が成り立つ。

【００１４】

【数２】

$$L2 = \frac{(E - P) \cdot t2}{P}$$

【００１５】即ち、表示パネル１から領域６１、６２までの適視距離Ｌは、左眼用の絵素と右眼用の絵素とのピッチＰに反比例する。しかしながら、例えば、上述の図６の立体映像表示装置と同様に、絵素ピッチが０．０１７５ｍｍ、ガラス基板の厚みが０．８５ｍｍ（この値はガラス基板の屈折率を考慮した空気換算距離）の液晶パネルを用い、該液晶パネルのガラス基板にバリア基板を接着して上記図５の立体映像表示装置を構成した場合、Ｐ＝０．０１７５ｍｍ、ｔ１＝０．８５ｍｍとなり、適視距離Ｌ２は３ｍ以上と大きくなる。このため、観察者は表示画面から遠くに離れなければ立体映像を観察することは出来ず、臨場感のある立体映像を観賞することが出来ないという問題がある。

【００１６】

【発明が解決しようとする課題】本発明は上記従来例の欠点に鑑み為されたものであり、立体映像を良好に観察することが出来る位置を表示画面に近付け、観察者が臨場感のある立体映像を観賞することが出来る立体映像表示装置を提供することを目的とするものである。

【００１７】

【課題を解決するための手段】本発明の第１の立体映像表示装置は、左眼用の絵素と右眼用の絵素とを有する表示パネルと、該表示パネルからの映像の光を部分的に遮光することにより左眼用の絵素からの光と右眼用の絵素からの光とに分離するバリア基板とからなるものにおいて、前記表示パネルに左眼用の異なる色の絵素が左右方向に沿って配列している左眼用の絵素域と、右眼用の異なる色の絵素が左右方向に沿って配列している右眼用の絵素域とを左右方向において交互に形成し、前記バリア基板に前記表示パネルからの映像の光を透過する透光部と、前記表示パネルからの映像の光を遮光する遮光部とを左右方向に交互に形成し、前記透光部に前記表示パネルの絵素の色と略同じ色のカラーフィルタを前記絵素の色と同様に配列するように設け、前記表示パネルの各絵素からの光を前記バリア基板の前記遮光部及び前記透光部に設けたカラーフィルタのうち前記絵素とは異なる色のカラーフィルタにより遮光することにより前記左眼用の絵素域からの光と前記右眼用の絵素域からの光とに分離することを特徴とする。

【００１８】また、本発明の第２の立体映像表示装置は、光源からの光の一部を遮光することにより左眼用の光と右眼用の光とに分離するバリア基板と、該バリア基板により分離された左眼用の光を左眼用の絵素の光とし、右眼用の光を右眼用の絵素の光とする表示パネルとからなるものにおいて、前記表示パネルに左眼用の異なる色の絵素が左右方向に沿って配列している左眼用の絵素域と、右眼用の異なる色の絵素が左右方向に沿って配列している右眼用の絵素域とを水平方向に交互に形成し、前記バリア基板に光源からの光を透過する透光部と、前記表示パネルからの映像の光を遮光する遮光部とを左右方向に交互に形成し、前記透光部に前記表示パネルの絵素の色と略同じ色のカラーフィルタを前記絵素の色と同様の配列になるように設け、前記表示パネルの各絵素の光を前記バリア基板の前記透光部に設けたカラーフィルタのうち略同じ色のカラーフィルタを通過した光だけにより形成することにより前記左眼用の絵素域からの光と前記右眼用の絵素域からの光とに分離することを特徴とする。

【００１９】更に、本発明の第１、第２の立体映像表示装置は、前記表示パネルの左眼用及び右眼用の異なる色の絵素が赤色絵素、緑色絵素及び青色絵素よりなり、前記バリア基板の透光部に設けたカラーフィルタが赤色フ

ィルタ、緑色フィルタ及び青色フィルタよりなることを特徴とする。

【００２０】

【作用】上述の第１の立体映像表示装置によれば、左眼用の絵素域と右眼用の絵素域とのピッチは、表示パネルを構成する絵素のピッチよりも大きくなる。即ち、上述の数１における分母が大きくなり、適視距離は小さくなる。

【００２１】また、上述の第２の立体映像表示装置によれば、左眼用の絵素域と右眼用の絵素域とのピッチは、表示パネルを構成する絵素のピッチよりも大きくなる。即ち、上述の数２における分母が大きくなり、適視距離は小さくなる。

【００２２】更に、前記表示パネルの左眼用及び右眼用の異なる色の絵素が赤色絵素、緑色絵素及び青色絵素よりなり、前記バリア基板の透光部に赤色カラーフィルタ、緑色カラーフィルタ及び青色カラーフィルタの３つのカラーフィルタを設けることにより上述の第１、第２の立体映像表示装置を構成した場合、３原色の用いた良好なカラー立体映像を表示することが出来る。そして、例えば、前記表示パネルの絵素配置が同じ色の絵素が上下方向に並んでいる構造のものである場合、左右の絵素域のピッチが表示パネルの絵素ピッチの約３倍になり、適視距離は約１／３になる。

【００２３】

【実施例】以下、図面を参照しつつ本発明の実施例について詳細に説明する。図１は第１実施例の立体映像表示装置の構成を示す図である。

【００２４】図１において、７はカラー映像を表示する液晶パネル等の表示パネル、８は前記表示パネル７の各絵素からの光の一部を通過させるバリア基板である。前記表示パネル７の絵素の配置パターンは、図２に示すように、同じ色の絵素は上下方向に並んでおり、左右方向においては観察者から見て右側から左側に向かって順に、左眼用の赤色絵素Ｒ１、左眼用の緑色絵素Ｇ１、左眼用の青色絵素Ｂ１、右眼用の赤色絵素Ｒ２、右眼用の緑色絵素Ｇ２、右眼用の青色絵素Ｂ２の順のパターンが繰り返し配列されている。即ち、左眼用の各色の絵素Ｒ１、Ｇ１、Ｂ１よりなる左眼用の絵素域と、右眼用の各色の絵素Ｒ２、Ｇ２、Ｂ２よりなる右眼用の絵素域とが交互に形成されている。

【００２５】前記表示パネル７の各絵素Ｒ１、Ｇ１、Ｂ１、Ｒ２、Ｇ２、Ｂ２は、各絵素の色に応じた色のカラーフィルタを備えており、該カラーフィルタにより赤色、緑色、青色の絵素となる。図３は前記カラーフィルタの光学特性を示す図であり、図中、Ｒは赤色絵素Ｒ１、Ｒ２に設けられた赤色カラーフィルタの光の波長による透過率分布、Ｇは緑色絵素Ｇ１、Ｇ２に設けられた緑色カラーフィルタの光の波長による透過率分布、Ｂは青色絵素Ｂ１、Ｂ２に設けられた青色カラーフィルタの光の波長による透過率分布である。

【００２６】前記バリア基板８は前記表示パネル７の各絵素からの光を透過する縦長の透光部８ａが光を遮光するバリア部８ｂを介して多数形成されているスリット状の基板である。前記透光部８ａには、観察者から見て右側から左側に向かって順に、赤色カラーフィルタ８Ｒ、緑色カラーフィルタ８Ｇ、青色カラーフィルタ８Ｂが形成されている。尚、この３色のカラーフィルタの配列順は、前記表示パネル７における３色の絵素の配列順と同じである。

【００２７】また、前記赤色、緑色、青色カラーフィルタ８Ｒ、８Ｇ、８Ｂの光学特性は、前記表示パネルの絵素Ｒ１、Ｒ２、Ｇ１、Ｇ２、Ｂ１、Ｂ２が備えるカラーフィルタの光学特性と同じで、図３に示す通りである。即ち、図３において、Ｒは赤色カラーフィルタ８Ｒの光の波長による透過率分布、Ｇは緑色カラーフィルタ８Ｇの光の波長による透過率分布、Ｂは青色カラーフィルタ８Ｂの光の波長による透過率分布である。

【００２８】前記バリア基板８の透光部８ａに設けられたカラーフィルタ８Ｒ、８Ｇ、８Ｂの各々の左右方向における寸法は夫々、Ａ・Ｅ／（Ｅ＋３Ｐ）で等しい。また、前記バリア基板８の遮光部８ｂの左右方向における寸法は、（４Ｐ－Ａ）・Ｅ／（Ｅ＋３Ｐ）である。但し、Ａは表示パネル（液晶パネル）７の絵素開口部寸法、Ｅは眼間距離、Ｐは表示パネル（液晶パネル）７の絵素ピッチである。尚、前記カラーフィルタ８Ｒ、８Ｇ、８Ｂの各々の左右方向における寸法は、従来の図６のものの透光部２ａの左右方向における寸法と略同じである。

【００２９】前記表示パネル７の赤色絵素Ｒ１、Ｒ２から出射された光は、前記バリア基板８の透光部８ａに設けられた赤色カラーフィルタ８Ｒのみを通過し、緑色カラーフィルタ８Ｇ及び青色カラーフィルタ８Ｂは通過しない。即ち、前記緑色カラーフィルタ８Ｇ及び青色カラーフィルタ８Ｂは赤色絵素Ｒ１、Ｒ２から出射された光に対してはバリア部８ｂと同様に遮光部として機能する。

【００３０】また、前記表示パネル７の緑色絵素Ｇ１、Ｇ２から出射された光は、前記バリア基板８の透光部８ａに設けられた緑色カラーフィルタ８Ｇのみを通過し、赤色カラーフィルタ８Ｒ及び青色カラーフィルタ８Ｂは通過しない。即ち、前記赤色カラーフィルタ８Ｒ及び青色カラーフィルタ８Ｂは緑色絵素Ｇ１、Ｇ２から出射された光に対してはバリア部８ｂと同様に遮光部として機能する。

【００３１】また、前記表示パネル７の青色絵素Ｂ１、Ｂ２から出射された光は、前記バリア基板８の透光部８ａに設けられた青色カラーフィルタ８Ｂのみを通過し、赤色カラーフィルタ８Ｒ及び緑色カラーフィルタ８Ｇは通過しない。即ち、前記赤色カラーフィルタ８Ｒ及び緑

色カラーフィルタ８Ｇは青色絵素Ｂ１、Ｂ２から出射された光に対してはバリア部８ｂと同様に遮光部として機能する．

【００３２】このような第１実施例の立体映像表示装置では、バリア基板８の前方には、左眼用の赤色絵素Ｒ１から出射された光は前記赤色カラーフィルタ８Ｒを通り、左眼用の緑色絵素Ｇ１から出射された光は前記緑色カラーフィルタ８Ｇを通り、左眼用の青色絵素Ｂ１から出射された光は前記青色カラーフィルタ８Ｂを通り入光する領域９１がある．この領域９１では、右眼用の赤色絵素Ｒ２から出射された光は前記緑色カラーフィルタ８Ｇ、青色カラーフィルタ８Ｂ及びバリア部８ｂにより遮光されて入光せず、右眼用の緑色絵素Ｇ２から出射された光は前記赤色カラーフィルタ８Ｒ、青色カラーフィルタ８Ｂ及びバリア部８ｂにより遮光されて入光せず、右眼用の青色絵素Ｂ２から出射された光は前記赤色カラーフィルタ８Ｒ、緑色カラーフィルタ８Ｇ及びバリア部８ｂにより遮光されて入光しない．

【００３３】また、バリア基板８の前方には、右眼用赤色の絵素Ｒ２から出射された光は前記赤色カラーフィルタ８Ｒを通り、右眼用緑色の絵素Ｇ２から出射された光は前記緑色カラーフィルタ８Ｇを通り、右眼用青色の絵素Ｂ２から出射された光は前記青色カラーフィルタ８Ｂを通り入光する領域９２がある．この領域９２では、左眼用の赤色絵素Ｒ１から出射された光は前記緑色カラーフィルタ８Ｇ、青色カラーフィルタ８Ｂ及びバリア部８ｂにより遮光されて入光せず、左眼用の緑色絵素Ｇ１から出射された光は前記赤色カラーフィルタ８Ｒ、青色カラーフィルタ８Ｂ及びバリア部８ｂにより遮光されて入光せず、左眼用の青色絵素Ｂ１から出射された光は前記赤色カラーフィルタ８Ｒ、緑色カラーフィルタ８Ｇ及びバリア部８ｂにより遮光されて入光しない．

【００３４】即ち、観察者は左眼を領域９１に位置させ、右眼を領域９２に位置させることにより、左眼では右眼用の絵素Ｒ２、Ｇ２、Ｂ２が見えずに左眼用の絵素Ｒ１、Ｇ１、Ｂ１だけが見え、右眼では左眼用の絵素Ｒ１、Ｇ１、Ｂ１が見えずに右眼用の絵素Ｒ２、Ｇ２、Ｂ２だけが見える．これにより、観察者は左眼では左眼用の映像を認識し、右眼では右眼用の映像を認識することにより立体映像を観察することが出来る．

【００３５】上述のような第１実施例の立体映像表示装置では、表示パネル７の水平方向における絵素の配列は、左眼用の絵素Ｒ１、Ｇ１、Ｂ１の３絵素が連続してなる左眼用の絵素域と右眼用の絵素Ｒ２、Ｇ２、Ｂ２の３絵素が連続してなる右眼用の絵素域とが交互に配置されている．即ち、左眼用の絵素域と右眼用の絵素域とは絵素ピッチＰの３倍のピッチ３Ｐで配列されている．

【００３６】従って、バリア基板８から前記領域９１、９２までの適視距離Ｌ3は、下記の数３のようになり、図６に示した従来の立体映像表示装置に比べて約１／３になる．

【００３７】

【数３】

$$L3 = \frac{E \cdot t3}{3P}$$

【００３８】例えば、絵素ピッチが０．０１７５mm、ガラス基板の厚みが０．８５mm（この値はガラス基板の屈折率を考慮した空気換算距離である）である液晶パネルを表示パネル７として用い、前記液晶パネルのガラス基板に前記バリア基板８を接着して第１実施例の立体映像表示装置を構成し、領域９１と領域９２との間の距離を人間の眼間距離６５mmになるように設定した場合、Ｐ＝０．０１７５mm、ｔ3＝０．８５mmとなり、数３より適視距離Ｌ3は約１mとなり、従来に比べて表示画面に近付く．このため、観察者は表示画面の近くで立体映像を観察することが出来、臨場感のある立体映像を観賞することが出来る．

【００３９】図４は第２実施例の立体映像表示装置の構成を示す図である．図４において、７はカラー映像を表示する液晶パネル等の表示パネル、１０は平面光源１１の光の一部を通過させるバリア基板である．

【００４０】前記表示パネル７の絵素の配置パターンは、上述の第１実施例の表示パネル７の配置パターンと同じであり、ここではその説明は省略する．前記バリア基板１０は前記平面光源１１からの光を透過する縦長の透光部１０ａが光を遮光するバリア部１０ｂを介して多数形成されているスリット状の基板である．前記透光部１０ａには、観察者から見て右側から左側に向かって順に、赤色カラーフィルタ１０Ｒ、緑色カラーフィルタ１０Ｇ、青色カラーフィルタ１０Ｂが形成されている．尚、この３色のカラーフィルタの配列順は、前記表示パネル７における３色の絵素の配列順と同じである．

【００４１】前記バリア基板１０の透光部１０ａに設けられたカラーフィルタ１０Ｒ、１０Ｇ、１０Ｂの各々の左右方向における寸法は夫々、Ａ・Ｅ／（Ｅ－３Ｐ）で等しい．また、前記バリア基板１０の遮光部１０ｂの左右方向における寸法は、（４Ｐ－Ａ）・Ｅ／（Ｅ－３Ｐ）である．但し、Ａは表示パネル（液晶パネル）７の絵素開口部寸法、Ｅは眼間距離、Ｐは表示パネル（液晶パネル）７の絵素ピッチである．尚、前記カラーフィルタ１０Ｒ、１０Ｇ、１０Ｂの各々の左右方向における寸法は、従来の図６のものの透光部２ａの左右方向における寸法と略同じである．

【００４２】前記平面光源１１から出射された光のうち表示パネル７の赤色絵素Ｒ１、Ｒ２の光となるものは、前記バリア基板１０の透光部１０ａに設けられた赤色カラーフィルタ１０Ｒを通過したストライプ状の光だけであり、緑色カラーフィルタ１０Ｇあるいは青色カラーフィルタ１０Ｂを通過したストライプ状の光は、赤色絵素Ｒ１、Ｒ２の光とはならない．即ち、前記緑色カラーフ

ィルタ１０Ｇ及び青色カラーフィルタ１０Ｂは、赤色絵素Ｒ１、Ｒ２に対してはバリア部１０ｂと同様に遮光部として機能する。

【００４３】また、前記平面光源１１から出射された光のうち表示パネル７の緑色の絵素Ｇ１、Ｇ２の光となるものは、前記バリア基板１０の透光部１０ａに設けられた緑色カラーフィルタ１０Ｇを通過したストライプ状の光だけであり、赤色カラーフィルタ１０Ｒあるいは青色カラーフィルタ１０Ｂを通過したストライプ状の光は、緑色絵素Ｇ１、Ｇ２の光とはならない。即ち、前記赤色カラーフィルタ１０Ｒ及び青色カラーフィルタ１０Ｂは、緑色絵素Ｇ１、Ｇ２に対してはバリア部１０ｂと同様に遮光部として機能する。

【００４４】また、前記平面光源１１から出射された光のうち表示パネル７の青色絵素Ｂ１、Ｂ２の光となるものは、前記バリア基板１０の透光部１０ａに設けられた青色カラーフィルタ１０Ｂを通過したストライプ状の光だけであり、赤色カラーフィルタ１０Ｒあるいは緑色カラーフィルタ１０Ｇを通過したストライプ状の光は、青色絵素Ｂ１、Ｂ２の光とはならない。即ち、前記赤色カラーフィルタ１０Ｒ及び緑色カラーフィルタ１０Ｇは、青色絵素Ｂ１、Ｂ２に対してはバリア部１０ｂと同様に遮光部として機能する。

【００４５】このような第２実施例の立体映像表示装置では、表示パネル７の前方には、前記赤色カラーフィルタ１０Ｒを通過したストライプ状の光が表示パネル７の左眼用の赤色絵素Ｒ１の光となって入光し、前記緑色カラーフィルタ１０Ｇを通過したストライプ状の光が表示パネル７の左眼用の緑色絵素Ｇ１の光となって入光し、前記青色カラーフィルタ１０Ｂを通過したストライプ状の光が表示パネル７の左眼用の青色絵素Ｂ１の光となって入光する領域１２１が形成される。尚、この領域１２１では、右眼用の絵素Ｒ２、Ｇ２、Ｂ２からの光は入光しない。

【００４６】また、前記表示パネル７の前方には、前記赤色カラーフィルタ１０Ｒを通過したストライプ状の光が表示パネル７の右眼用の赤色絵素Ｒ２の光となって入光し、前記緑色カラーフィルタ１０Ｇを通過したストライプ状の光が表示パネル７の右眼用の緑色絵素Ｇ２の光となって入光し、前記青色カラーフィルタ１０Ｂを通過したストライプ状の光が表示パネル７の右眼用の青色絵素Ｂ２の光となって入光する領域１２２が形成される。尚、この領域１２２では、左眼用の絵素Ｒ１、Ｇ１、Ｂ１からの光は入光しない。

【００４７】即ち、観察者は左眼を領域１２１に位置させ、右眼を領域１２２に位置させることにより、左眼では右眼用の絵素Ｒ２、Ｇ２、Ｂ２が見えずに左眼用の絵素Ｒ１、Ｇ１、Ｂ１だけが見え、右眼では左眼用の絵素Ｒ１、Ｇ１、Ｂ１が見えずに右眼用の絵素Ｒ２、Ｇ２、Ｂ２だけが見える。これにより、観察者は左眼では左眼用の映像を認識し、右眼では右眼用の映像を認識することにより立体映像を観察することが出来る。

【００４８】上述のような第２実施例の立体映像表示装置では、表示パネル７の水平方向における絵素の配列は、左眼用の絵素Ｒ１、Ｇ１、Ｂ１の３絵素が連続してなる左眼用の絵素域と右眼用の絵素Ｒ２、Ｇ２、Ｂ２の３絵素が連続してなる右眼用の絵素域とが交互に配置されている。即ち、左眼用の絵素域と右眼用の絵素域とは絵素ピッチＰの３倍のピッチ３Ｐで配列されている。

【００４９】従って、表示パネル７から前記領域１２１、１２２までの適視距離Ｌ4は、下記の数４のようになり、図７に示した従来の立体映像表示装置に比べて約１／３になる。

【００５０】

【数４】

$$L4 = \frac{(E - P) \cdot t4}{3P}$$

【００５１】例えば、絵素ピッチが０．０１７５ｍｍ、ガラス基板の厚みが０．８５ｍｍ（この値はガラス基板の屈折率を考慮した空気換算距離である）の液晶パネルを表示パネル７として用い、該前記液晶パネルのガラス基板にバリア基板１０を接着して第２実施例の立体映像表示装置を構成し、領域１２１と領域１２２との間の距離を人間の眼間距離６５ｍｍになるように設定した場合、Ｐ＝０．０１７５ｍｍ、ｔ4＝０．８５ｍｍとなり、数４より適視距離Ｌ4は約１ｍとなり、従来例に比べて表示画面に近付く。このため、観察者は表示画面の近くで立体映像を観察することが出来、臨場感のある立体映像を観賞することが出来る。

【００５２】尚、上述の第１、第２実施例では、表示パネル７として同じ色の絵素が上下方向に並んでいる構造のものを用いたが、本発明は絵素の配置が上記表示パネル７とは異なる構造のものに対しても適用可能である。

【００５３】例えば、図５に示すように、奇数行目の絵素と偶数行目の絵素とが半絵素分だけ左右方向にずれて形成されているデルタ配置の絵素構造の表示パネルに対しても本発明は適用可能である。この場合は、奇数行の絵素と偶数行の絵素の２行の絵素を１組として注目すると、左眼用の各色の絵素Ｒ１、Ｇ１、Ｂ１とからなる絵素域と、右眼用の各色の絵素Ｒ２、Ｇ２、Ｂ２とからなる絵素域とは水平方向において交互に形成されている。尚、図５において、各絵素域は破線で区切られている。

【００５４】また、本発明は、表示部の前方にレンズを配置して、観察者に虚像を観察させるものに適用しても良い。

【００５５】

【発明の効果】本発明によれば、観察者が表示画面の近くで臨場感のある立体映像を観賞することが出来る立体映像表示装置を提供し得る。

【００５６】更に、本発明によれば、良好なカラー表示

も可能である立体映像表示装置を提供し得る．

【図面の簡単な説明】

【図１】本発明の第１実施例の立体映像表示装置の基本構成を示す図である．

【図２】本発明の第１実施例に用いられる表示パネルの絵素の配置パターンを示す図である．

【図３】本発明の第１実施例のバリア基板に用いられるカラーフィルタの光の波長による透過率分布を示す図である．

【図４】本発明の第２実施例の立体映像表示装置の基本構成を示す図である．

【図５】本発明の他の実施例に用いれれる表示パネルの絵素の配置パターンを示す図である．

【図６】従来の立体映像表示装置の基本構成を示す図である．

【図７】従来の立体映像表示装置の基本構成を示す図である．

【符合の説明】

７　表示パネル

８　バリア基板

８ａ　透光部

８ｂ　遮光部

８Ｒ　赤色カラーフィルタ

８Ｇ　緑色カラーフィルタ

８Ｂ　青色カラーフィルタ

１０　バリア基板

１０ａ　透光部

１０ｂ　遮光部

１０Ｒ　赤色カラーフィルタ

１０Ｇ　緑色カラーフィルタ

１０Ｂ　青色カラーフィルタ

Ｒ１　左眼用の赤色絵素

Ｇ１　左眼用の緑色絵素

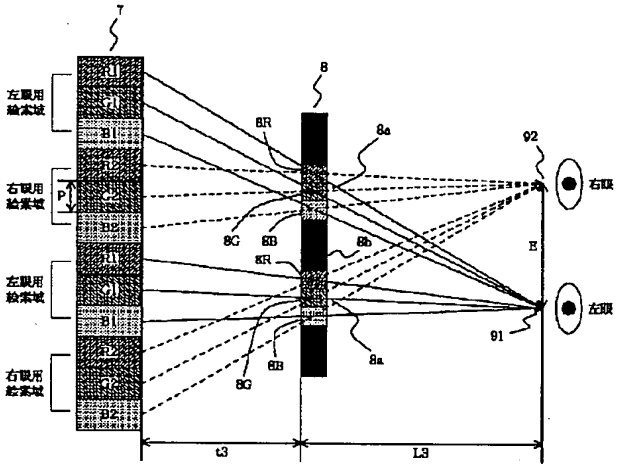
Ｂ１　左眼用の青色絵素

Ｒ２　左眼用の赤色絵素

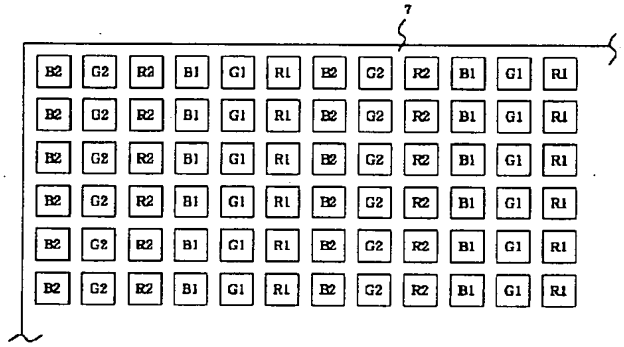
Ｇ２　左眼用の緑色絵素

Ｂ２　左眼用の青色絵素

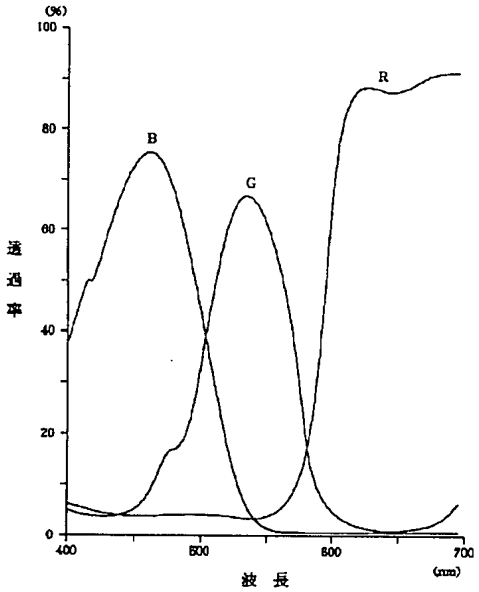
【図１】



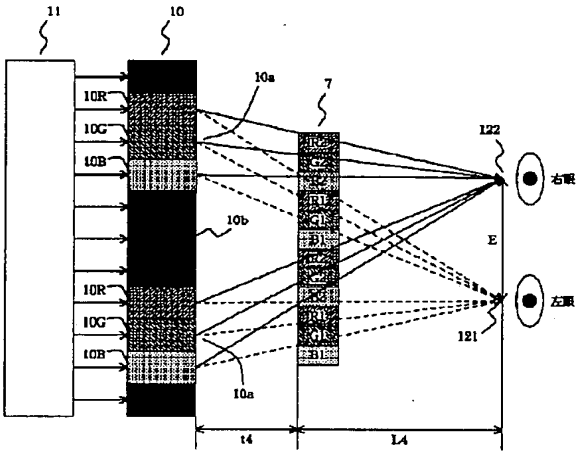
【図２】


7
B2 G2 R2 B1 G1 R1 B2 G2 R2 B1 G1 R1

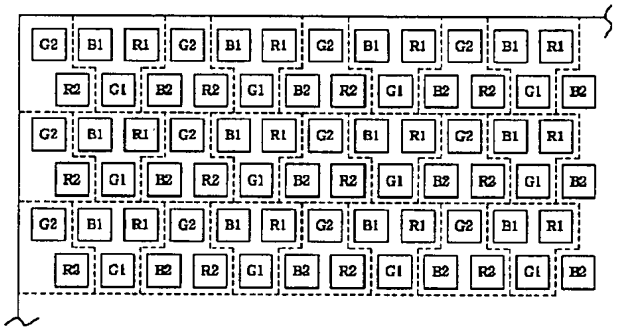
【図３】


(%)
100
80
60
40
20
0
B
G
R
400
500
600
700
(nm)
透過率
波長

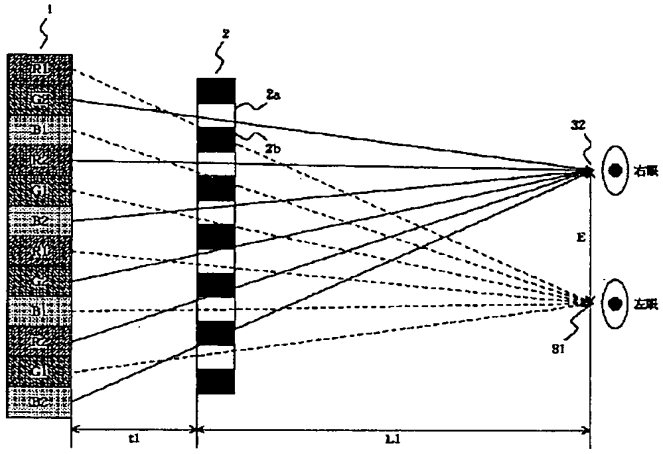
【図４】


11
10
10a
7
122
10R
10G
10B
10b
右眼
E
左眼
121
t4
L4

【図５】


G2 B1 R1 G2 B1 R1 G2 B1 R1 G2 B1 R1
R2 G1 B2 R2 G1 B2 R2 G1 B2 R2 G1 B2

【図６】



【図７】